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| APPLICATION NO.                        | FILING DATE | FIRST NAMED INVENTOR                    | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--|-------------|---|---------------------|------------------|
| 10/524,506                             | 02/14/2005  | Patrick Louis Theodorus Martin Frederix | 3024-111            | 6232             |
| 46002                                  | 7590        | 03/16/2007                              | EXAMINER            |                  |
| JOYCE VON NATZMER                      |             |   | DETSCHEL, MARISSA   |                  |
| HVP LLP                                |             |   | ART UNIT            | PAPER NUMBER     |
| 200 Madison Avenue                     |             |   |                     |                  |
| Suite 1901                             |             |   |                     |                  |
| New York, NY 10016                     |             |   | 2886                |                  |
| SHORTENED STATUTORY PERIOD OF RESPONSE | MAIL DATE   |   | DELIVERY MODE       |                  |
| 3 MONTHS                               | 03/16/2007  |   | PAPER               |                  |

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

|                              |                        |                     |
|------------------------------|------------------------|---------------------|
| <b>Office Action Summary</b> | <b>Application No.</b> | <b>Applicant(s)</b> |
|                              | 10/524,506             | FREDERIX ET AL.     |
|                              | <b>Examiner</b>        | <b>Art Unit</b>     |
|                              | Marissa J. Detschel    | 2886                |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on 14 February 2005.
- 2a) This action is FINAL.                    2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_\_ is/are allowed.
- 6) Claim(s) 1,2 and 5-12 is/are rejected.
- 7) Claim(s) 3 and 4 is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on 14 February 2005 is/are: a) accepted or b) objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
 a) All    b) Some \* c) None of:  
 1. Certified copies of the priority documents have been received.  
 2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

|   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>2/05</u> . | 5) <input type="checkbox"/> Notice of Informal Patent Application |
|   | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### ***Response to Amendment***

The preliminary amendment filed on February 14, 2005, has been entered.

### ***Information Disclosure Statement***

The information disclosure statement filed on February 14, 2005, has been fully considered by the Examiner except EP 0557743, since no copy of this document has been submitted with the information disclosure statement.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

Claims 1, 2, 5-9, 11, and 12 are rejected under 35 U.S.C. 102(a) as being anticipated by Kim et al. (USPN 6,713,743).

Regarding claim 1, Kim discloses a sensor (Figures 3 and 4 below) comprising:

FIG. 3

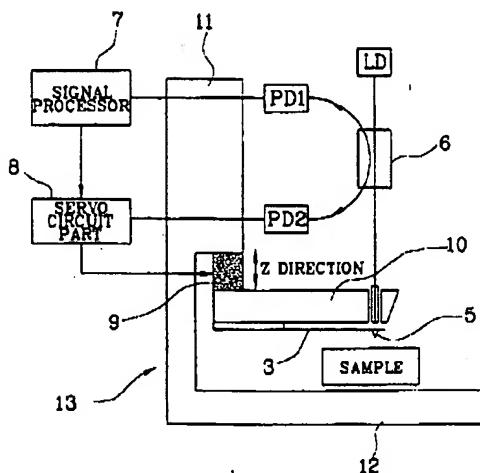
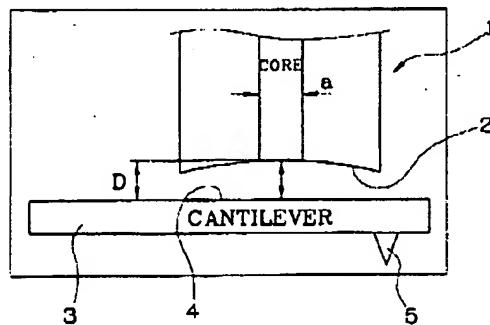


FIG. 4



a cantilever (3) having a position;

a first mirror (4) being arranged on said cantilever (3);  
an optical resonator (between 2 and 3) having a length that is dependent on the position of the cantilever (3);  
a lens assembly (1) for focusing light onto the cantilever (3) and having an output surface (2) facing the cantilever (3);

wherein

the position of the cantilever (3) depends on a parameter to be measured;

said output surface (2) is concave and forms a second mirror, and

said resonator is formed between said first (4) and second mirror (2).

Kim discloses an apparatus comprising an optical fiber (1) for measuring the displacement of a cantilever (3) having a tip (5) for touching a sample mounted on a body (12), as in an atomic force microscope. The optical fiber has an end (2) with a concave mirror shape disposed above the cantilever (3). The upper side of the cantilever (3) has a reflective surface (4). Most of the light beams irradiated at the reflective surface (4) of the cantilever (3) through the optical fiber (1) are reflected toward a core of the optical fiber (1). Therefore, the optical fiber (1) is a lens assembly that focuses light onto the cantilever. The photons reciprocating between the end (2) of the optical fiber (1) and the reflective surface (4) of the cantilever (3) create multiple interferences. Therefore, a resonator is formed between the first and second mirror.  
(column 4, lines 18-65)

Regarding claim 2, the output surface is substantially parallel to impinging wavefronts of a standing optical wave within said resonator (column 4, lines 57-65).

In regards to claim 5, Kim's device further comprises an optical fiber that projects an end of the optical fiber on the cantilever. This is illustrated above in the figures.

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In regards to claim 6, the output surface (4) is coated with a reflective coating (column 4, lines 28-29).

In regards to claim 7, the cantilever is coated with a reflective coating (column 4, lines 29-30).

Regarding claim 8, the light is not broken at the output surface (column 4, lines 57-65).

Regarding claim 9, the cantilever is fixed at a first end and deflectable at a second end (column 4, line 18-27).

In regards to claim 11, the lens assembly is mounted to a positioning device (column 6, line 65 to column 7, line 6).

Regarding claim 12, the sensor of Kim is used in a scanning force microscope in the form of an atomic force microscope (abstract).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

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Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al. (USPN 6,713,743) as applied to claim 1 above.

Kim does not disclose that the resonator has a loss of less than 20% per round trip. Kim does disclose that with the concave mirror shape of the fiber, photons can satisfy a stable condition which is reciprocally reflected between the two surfaces of the resonator (i.e. more reflected photons are collected at the core of the fiber). If the two surfaces are parallel, there is a loss of the number of photons collected at the core of the fiber. (column 4, lines 57-65)

It would have been obvious to one of ordinary skill in the art at the time of the invention to use a concave mirror shape of the fiber in the resonator of Kim that provides a loss of less than 20% per round trip resulting in more of the reflected photons being collected, creating a more accurate measurement of the position of the cantilever, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272 USPQ 215 (CCPA 1980).

#### ***Allowable Subject Matter***

Claims 3 and 4 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

As to claim 3, the prior art of record, taken alone or in combination, fails to disclose or render obvious the use of a lens assembly comprising an output lens having a convex first face and a concave second face in a sensor comprising an optical resonator for measuring the position of a cantilever, in combination with the rest of the limitations of claim 3. Claim 4, which is dependent from claim 3, is also allowable subject matter due to its dependency on claim 3.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Marissa J. Detschel whose telephone number is 571-272-2716. The examiner can normally be reached on M-F 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tarifur Chowdhury can be reached on 571-272-2287. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

March 14, 2007  
MJD



HWA (ANDREW) LEE  
PRIMARY EXAMINER